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Description

Reduced Recoil Anti-Armor Gun

Cross Reference to Related Applications

[0001] This appliation claims benefit under 35 USC 199(e) of provisional application 60/320000, filed March 11, 2003, the entire file wrapper contents of which provisional application are herein incorporated by reference as though fully set forth at length.

Federal Research Statement

[0002] The invention described herein may be manufactured and used by, or for the Government of the United States for governmental purposes without the payment of any royalties thereon.

Background of Invention

[0003] FIELD OF THE INVENTION The present invention relates in general to the field of .50 caliber and 25mm Barrett anti-armor rifles. More specifically, the present invention relates to modifying the Barrett Model 82A1 semi-automatic rifle and derivative family of weapons to reduce recoil.

[0004] The present invention is related to US patents 4,677,897, 4,932,309, 4,932,148 and 4,867,040 to Barrett.

[0005] PRIOR ART

[0006] A variety of weapons have been developed over the years that use the forward moment of the recoiling mass to offset a portion of the recoil impulse from firing. The 40mm MK19 Grenade Machine Gun is one such weapon. The current invention consists of a means for modifying the existing Barrett Anti-Armor Guns to take advantage of this method of recoil reduction.

[0007] BACKGROUND OF THE INVENTION

[0008] The Barrett Anti-Armor Gun currently manufactured for sale in the US and other countries weighs approximately 28 pounds. The weapon fires from the closed bolt. The .50 caliber Model 82A1/XM107 produces a recoil energy of approximately 35 foot-pounds when an efficient muzzle brake is used. The .50 caliber Model 82A1/XM107 produces a recoil energy of approximately 60 foot-pounds when a sound suppressor is fitted to the muzzle instead of a muzzle brake. The 25mm XM109 variant of this weapon produces a recoil energy of approximately 80 foot-pounds while using a muzzle brake, and approxi-

mately 90 foot-pounds with a bare muzzle.

[0009] The United States military generally will not permit soldiers to fire shoulder fired weapons with recoil energy in excess of 60 foot-pounds. Prior concepts for reducing recoil of the Barrett .50 caliber Model 82A1/XM107 and 25mm XM109 rifles involved increasing the recoiling mass, reducing the muzzle velocity of the ammunition, improving the effectiveness of the muzzle brake, or a combination of each. The present invention provides a simple means for reducing recoil energy.

Summary of Invention

[0010] The present invention consists of modifying the weapon to fire from the open bolt such that the forward momentum of the recoiling parts counteract a significant portion of the recoil impulse from firing. The potential for recoil reduction will be illustrated with the following calculations. The calculations are for teaching purposes only. The various parameters may be adjusted as desired to meet specific design objectives.

[0011] The 25mm XM109 uses ammunition with an impulse of approximately 13 pound-seconds. The recoiling mass of the XM109 is approximately 12 pounds. The recoil energy for the current XM109 firing from the closed bolt with a

muzzle brake fitted is approximately 80 foot-pounds.

[0012] Modifying the XM109 to fire from the open bolt using the present invention requires adding a sear to the trigger mechanism and adding an appropriate corresponding sear notch to the bolt carrier. A firing pin sear trip is also added so that the firing pin releases after bolt locking is completed and while the bolt is still moving forward. The stiffness of the drive spring may also be adjusted to provide the desired bolt, bolt carrier and barrel momentum at the moment of firing. Increasing the drive spring stiffness to produce a forward momentum of approximately 4.3 pound-seconds will reduce the recoil energy to 60 foot-pounds.

Brief Description of Drawings

[0013] The features of the present invention and the manner of attaining them will become apparent, and the invention itself will be understood by reference to the following description and the accompanying drawings. In these drawings, like numerals refer to the same or similar elements. The sizes of the different components in the figures might not be in exact proportion, and are shown for visual clarity and of the purpose of explanation: FIG. 1 is a cross-sectional, side elevational view of an anti-armor rifle with

the bolt and bolt carrier to the rear; FIG. 2 is a cross-sectional, side elevational view of an anti-armor rifle during cartridge stripping and chambering; FIG. 3 is a cross-sectional, side elevational view of an anti-armor rifle with the cartridge fully chambered; FIG. 4 is a cross-sectional, side elevational view of an anti-armor rifle with the bolt, bolt carrier and barrel at the fire position; FIG. 5 is a cross-sectional, side elevational view of an anti-armor rifle during case ejection; FIG. 6 is a cross-sectional, side elevational view of an anti-armor rifle at the sear position;

Detailed Description

[0014] FIGS. 1 through 6 illustrate how the improved anti-armor weapon functions. The improvements allow the weapon to fire from the open bolt whereby the forward momentum of the recoiling masses is used to offset a significant portion of the impulse from firing.

[0015] FIG. 1 illustrates the improved anti-armor weapon where a sear notch has been added to the bolt carrier and the trigger mechanism has been modified to hold the bolt carrier to the rear, open position. The drive spring may be enlarged to adjust the forward momentum of the recoiling components as desired.

[0016] FIG. 2 depicts the improved anti-armor weapon after the

trigger is pulled. The bolt is shown moving forward, stripping and chambering the cartridge.

[0017] FIG. 3 shows the cartridge chambered and the bolt locked. The bolt, bolt carrier and barrel are continuing forward with significant momentum.

[0018] FIG. 4 illustrates the weapon at the moment of firing. The firing pin sear has been released and the firing pin is striking the primer in the base of the cartridge. Projectile is traveling down the barrel.

[0019] FIG. 5 shows the bolt returning to the rear with the spent case ejecting.

[0020] FIG. 6 depicts the bolt returned to the seared position.